DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23651-5194

REPLY TO
ATTENTION OF

2 MAR 1999

ATCD-RP

MEMORANDUM FOR

PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE ARMY (MANPOWER AND RESERVE AFFAIRS), 111 ARMY PENTAGON, WASHINGTON, D.C. 20310-0111
DEPUTY UNDER SECRETARY OF THE ARMY (OPERATIONS RESEARCH), 102 ARMY PENTAGON, WASHINGTON, D.C. 20310-0102

SUBJECT: System of Systems Approach Within TRADOC

1. Reference minutes, MANPRINT General Officer Steering Committee (GOSC), 4 August 1998.

2. As promised at the last GOSC meeting, the enclosed white paper on how the "system of systems" is being addressed by TRADOC is forwarded to the GOSC co-chairs.

3. The TRADOC point of contact for this action is Mr. Steve Dwyer, ATCD-RP, DSN 680-3477, E-mail: dwyers@monroe.army.mil.

FOR THE COMMANDER:

Charles W. Thomas

Encl

CHARLES W. THOMAS
Major General, U.S. Army
Chief of Staff

The System-of-Systems Approach to Warfighting Requirements

The purpose of this white paper is to provide a better understanding of how U.S. Army Training and Doctrine Command (TRADOC) uses the system-of-systems approach in the development of Army's warfighting requirements.

We have moved from the Cold War, threat-based Army of Excellence to a capabilities-based, force projection force able to dominate throughout the spectrum of conflict. The Organizational and Operational Concept for Army Division XXI and attached Army Division XXI overview provide the system-of-system focus for the development of warfighting solutions and concepts of operation. This approach will lead to the development of subordinate warfighting concepts and future operational capabilities in support of Army XXI; focus future research and development; provide clear hypotheses for test, experimentation, and analyses; and will lead to integrated doctrine, training, leader development, organization, materiel and soldier (DTLOMS) solutions sets to desired Army capabilities.

The system-of-systems approach to developing DTLOMS solutions leverages the synergy that is produced when complementary systems are placed on the battlefield. For example, pairing the like capabilities of the M2A3 and the M1A2SEP makes both systems more capable when placed side by side on the battlefield. Similarly, the M2A2/ODS and M1A1D are being paired to take advantage of their similar capabilities.

Expanding on this thought, when you internet the combat systems described above with indirect fire, reconnaissance, support and other assets, the synergistic effect is a force capable of dominating the battlespace and setting the conditions to ensure that dominance is maintained. For example, national intelligence assets can cue JSTARS coverage of potential enemy movement. Unmanned aerial vehicles (UAV's) can be dispatched to verify the virtual data with eyes on the target. Future Scout and Cavalry Systems and Commanche reconnaissance assets can provide constant surveillance of enemy forces as the commander develops his plan and sets the conditions that are favorable to the friendly side in the close fight. Indirect fire assets are brought to bear based on the fused intelligence information from all of the previous assets, to further shape the conditions for the close fight. Finally, direct fire assets, mounted and dismounted, because of their increased lethality and survivability due to the system of systems synergy, are able to

engage the enemy at ranges that ensure their success in the close fight.

The examples above describe how the system of systems concept allows us to mass effects, not forces. The synergy this brings to the battlefield makes the force many times more effective than the simple addition of individual systems to the fight would imply.

This concept applies across the entire spectrum of conflict. It includes Joint and coalition warfare and supports the tenets of Army Vision 2010 and Joint Vision 2010. Further, it applies to combat service support, civil affairs and other operations.

Within the context of the Heavy Force Modernization Plan, we are synchronizing the fielding of systems to Brigade Combat Teams (BCT) in division fielding windows. Previously, individual systems were fielded in isolation of other systems. Each program/product was "stove piped" without regard to others. Now with the system-of-systems approach, we link and synchronize the fielding of systems-of-systems in order to ensure the Force XXI units can more effectively operate on the modern battlefield.

This system-of-systems approach will be applied toward all future fieldings, with the BCT serving as the cornerstone - similar to the Navy's use of the Carrier Battle Group and the Air Force's use of a Wing. During the Program Objective Memorandum builds, we will be equipping and talking in terms of "Brigades worth" of modernization rather than individual systems.

Application of the system-of-system approach should ultimately reduce total ownership costs and assist the Army in meeting its modernization objectives by taking a holistic view of future warfighting and the structure of future military operations. Increased operational efficiency at a lower cost must be a fundamental goal in all materiel decisions, including under the system-of-systems approach. Cost should continue to be treated as an independent variable It will not be possible to optimize the operational force when we field the weapons systems essential to the digitized force and the Army After Next without this holistic approach in the design and development of the future Army.